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KNOWLEDGE PIPELINE IN FREIGHT PIPELINE INDUSTRY: COMPETENCE- BASED MODEL FOR OPEN INNOVATION

Irene Martín-Rubio, Mar Criado-Fernández, Pilar Quevedo Cano,

Carmen Pérez Cano, Julián Miguel Solana Álvarez, Paula Fernández

GIO: GRUPO INGENIERÍA DE ORGANIZACIÓN (EUITI-ETSIT-EUI) UPM.

Ronda de Valencia, 3 Madrid. 28012 Madrid Irene.mrubio@upm.es

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Abstract. *There is growing concern over the challenges for innovation in Freight Pipeline industry. Since the early works of Chesbrough a decade ago, we have learned a lot about the content, context and process of open innovation. However, much more research is needed in Freight Pipeline Industry.*

The reality is that few corporations have institutionalized open innovation practices in ways that have enabled substantial growth or industry leadership. Based on this, we pursue the following question: How does a firm's integration into knowledge networks depend on its ability to manage knowledge?

A competence-based model for freight pipeline organizations is analysed, this model should be understood by any organization in order to be successful in motivating professionals who carry out innovations and play a main role in collaborative knowledge creation processes. This paper aims to explain how can open innovation achieve its potential in most Freight Pipeline Industries.

Keywords. Open innovation, core competences, individual competences, absorptive capacity, external knowledge management, collaboration & intercultural competences.

Introduction

There is growing concern over the challenges for innovation in Freight Pipepline industry. (ASCE, 1998). As companies sought competitive advantage via innovation, Prof. Henry Chesbrough urged top leaders to recognize and act on his radical concept of opening up the corporation to the outside world, explaining that Open Innovation mean that valuable ideas can come from inside or outside the company and can go to market from inside or outside the company as well.

However, much more research is needed in Freight Pipeline Industry since not all lessons learned from early adopters may be applicable to following firms. There are still many open innovation issues that we need to understand better in order to absorb the new concept fully in integrated (innovation) management theories. Huizing (2011) indicates that we still lack knowledge about how to do it and when to do it.

A firm's external knowledge is considered as a complementary asset which it may use for recombining it with its internal knowledge assets. Focusing on a firm's network relations on the one hand and its organizational absorptive capacity on the other, we put this into the perspective of the competence-based mindset of the firm.

Given the relevance of collaboration with external partners a further competence is a firms's organizational capability to manage knowledge flows. Both together are suggested to represent the absorptive capacity of the firm. These can be represented by a firm's network of relations to other actors, each relation representing another external knowledge source. In this knowledge flows, individuals play a crucial role in collaborative knowledge creation process.

The present paper examines the strategic competences as well the operational competences at the individual level in order to collaborate efficiently in open innovation teams.

Open Innovation and Competence-Based Model

Following Chesbrough (2003) open innovation can be defined as "the use of purposive inflows and outflows of knowledge to accelerate internal innovation and to expand the markets for external use of innovation, respectively". This suggests that open innovation consists of two main activities: bringing external knowledge into the firm and bringing internal knowledge outside the firm.

Usually, in the innovation process, the ideas are analyzed in order to select the most promising of them to carry on the development process. The less promising ideas are abandoned. What distinguish open innovation process from closed innovation is that in the latter all ideas, inventions, research and development are generated within the company until the final product is released to market. However, with the open innovation the company can make use of external competence (i.e. technology) and even allow other organizations to develop products based on their innovations.

Under an open innovation model, firms can get use of outside knowledge, resulting in collaborative projects with external partners or the purchase and incorporation of external technologies. At the same time, innovations emerged from the company, can be sold in form of technologies and / or industrial property to other organizations, because they are not of strategic importance within the business model or because the company has no capacity or experience to develop itself. The end result, is that some products catch the market through a route entirely internal, from the idea stage to commercialization stage, while others are the result of the incorporation of external knowledge at different phases of its development.

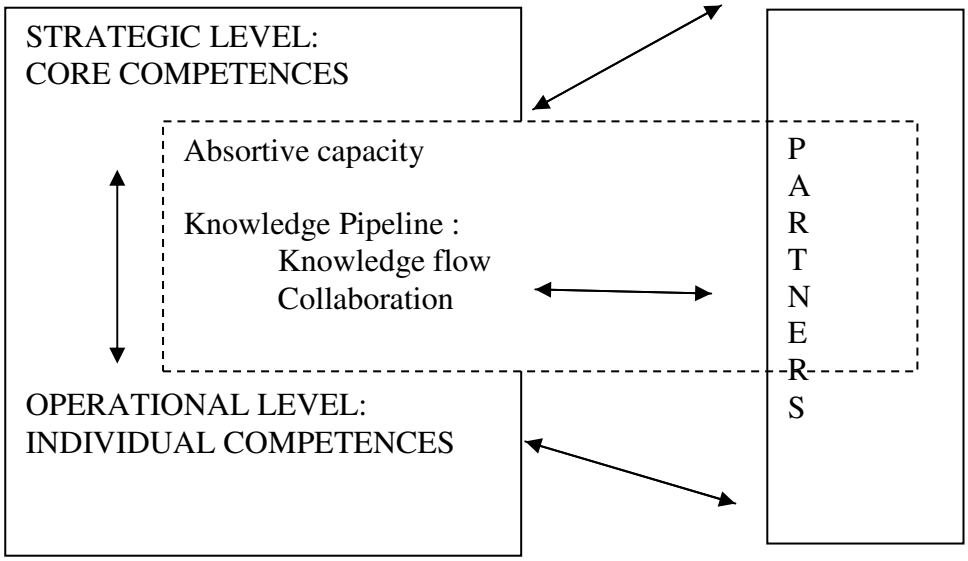

Figure 1: Competence-based mindset for open innovation

The fact is that few corporations have institutionalized open innovation practices in ways that have enabled substantial growth or industry leadership. Rufat-Latre et al. (2010) indicates four conditions that explain the gap that exits between the promise and reality of open innovation in most organizations:

1- An unwillingness to change comfortable habits and practices, especially when it comes to sharing ideas and intellectual property with anyone outside the organization.
2- A managerial mindset that thinks of competition primarily in terms of a battle for market share in a zero-sum-game –rather that a battle for new markets using competence-based advantage to produce customer value.
3- Organizational and incentive structures that promote and reward the exclusive use of internal resources for high-value added activities (Perez-Cano y Quevedo-Cano, 2006)
4- A mindset that views open innovation only as a new product development and commercialization process- rather than an integral part of ongoing strategy. As a result, open innovation is unlikely to achieve its potential in most companies. So the first step in delivering the promise of open innovation is for leaders to start making the change from a market-share mindset to a competence-based mindset. A key decision to combine

cultural expectations, managerial mindset and competence-based focus that led to success in becoming open.

Organizations that excel at open innovation have a deeply shared view about their own strengths, weakness, opportunities, threats (SWOT analysis) and their vision. They have spent time and effort defining themselves not in terms of the products or services they offer or the markets they serve, but in terms of what they are uniquely good at that can make a difference in the world – their core competences, as defined by Hamel and Prahalad (1994).

By developing SWOT analysis, these companies begin to compete outside of their traditional boundaries. Companies should look open innovation as a means to solving a very specific problem: the need to source products and technologies in a way that leverages and strengthens its brand. Companies should recognizes where is the opportunity and where is its core competences. The technology and science required to develop these products don't require the same set of skills, processes, technologies, values and assets required to build and maintain a firm focused on previous products.

Companies should uses a form of open innovation to exploit its customers' desire for variety in content, which can be delivered by its competency set. It achieves dramatic growth by connecting its competency to content that is created both within and outside its organization.

Chesbrough's original concept of open innovation provides a means for developing a strategic advantage. The organizational ability to move into and out of different industries by capitalizing on ideas and concepts from inside and outside the organizations has tremendous intangible value. It also provides established companies with a way to keep up with new entrants as industries mutate and evolve. However, without a proper mindset and, ultimately, operational structure in place, the promise of open innovation cannot be realized.

Culture, leadership, incentives, skills, operational process and a whole host of internal systems have historically been optimized for maintaining a closed system. When companies know who they are and what they are good at, they are then able to begin restructuring their organizations to take advantage of the benefits that open innovation offers. Companies should fulfil the following steps before taking projects in open innovation:

Define the company's core competences: the one, two or three bundles of skills, processes, technologies, assets, and values that explain your success and deliver value to customers.

1- Define new areas of growth where you can leverage your core competences.
2- Each area of growth companies define might require a business model that needs not only their core competence, but also some additional ones. Companies should define competences gaps for each area of growth.
3- Companies should change their internal processes and culture to allow these outside partners to begin playing a vital role in filling the gaps and completing the business model required for success in your new growth area.
4- Instituting a process that provides comfort as companies move into open innovation is not something that happens suddenly. It's an iterative process that takes time and experimentation to get right. Furthermore, it's a company-specific process, because each company is different in terms of their SWOT analysis (who they are), its mission (what it delivers) and its organization (how it has historically structure itself to get to where it is today).

In summary, with the introduction of open innovation the organizational boundaries become permeable, allowing companies to integrate corporate resources with those belonging to

their external partners. In the closed innovation firms innovate using only their internal resources.

That implies that companies should change organizationally before they can fully embrace open innovation. The first step an organization should face when implementing open innovation is starting by making the change from a competition-focused & market-share to a competence-based mindset. Knowing who they are and what they are good at, allow companies to take advantage of their projects in open innovation.

Knowledge Management and Absorptive Capacity

Innovation is a complex activity in which new knowledge is applied for commercial ends. Part of this knowledge reaches the firm from external sources, which are recognized as a pivotal element in the success of a firm innovation's activity (Escribano et al. 2009). Involuntary external knowledge flows constitute a prototypical example of external knowledge sources that a firm can potentially exploit to enhance performance. Involuntary external knowledge flows are sometimes referred as knowledge spillovers. (Cassiman and Veugelers, 2002) and it can play a dual role. Incoming knowledge spillovers might be beneficial, whereas outgoing knowledge spillovers might benefit competitors.

A firm's external knowledge is considered as a complementary asset which it may use for recombining it with its internal knowledge assets. Focusing on a firm's network relations on the one hand and its organizational absorptive capacity on the other, we put this into the perspective of the competence-based mindset of the firm.

This new approach requires changing some of the groundwork for action on the strategy followed by the company in terms of innovation. In particular, poses a new way of action to enhance the ability to identify, assimilate and commercially exploit the knowledge generated outside the company, which the firm has access. That is a new way to increase what its called "absorptive capacity".

Absorptive capacity has become one of the most significant constructs in the last twenty years precisely because external knowledge are so important (Camisón & Forés, 2009). The company´s capacity to absorb, defined as its ability to identify, assimilate and apply for commercial purposes know-how generated outside itself (Cohen & Levinthal, 1989, 1990) has in this way been considered one of the most relevant business characteristic in determining the effort put into innovation. As pointed out by Cohen y Levinthal (1990, p.128) capacity to evaluate and use external know-how is largely a function of prior related knowledge. At its lowest level, they see this prior knowledge as including basic abilities or just shared language, but it can also refer to awareness of the most recent technological or scientific advances in a given field. These authors note that such prior knowledge arises as a by-product of carrying out own R&D activities.

Companies must create and support R & D departments, to lead this absorptive capacity to act as "capillarity nodes". Obviously, an increase in capillarity and a proper management of networks that improves it, will impact positively on the company's ability to introduce open innovation habits. This increase in capillarity and opening to the outside depend on the settlement of distributed systems to observe the environment (distributed capillarity) to implement policies open to ideas from outside, to participate systematically in events and networks of their environment, encourage staff mobility, assuming the risks that this might

entail, create networks of gate keepers to scrutinize the environment in search of synergies and improve listening skills in the field of Internet, among others.

The existence of knowledge networks in a given sector does not affect all the firms operating in it with the same intensity. The extent to which they make use of the knowledge they offer will depend, for the most part, on the knowledge and capacities each business has at its disposal. Only firms having accumulated a critical mass of know-how and in possession of a certain capacity for absorption, will be able to take advantage of the pool of technological knowledge. In contrast, business not attaining the minimum critical mass of knowledge will not be able to enjoy the advantages of belonging to a environment of great technological opportunities.

The absorptive capacity of a firm is not a given asset but has to be developed and accumulated overtime. Among the factors positively contributing to a firm's absorptive capacity is Knowledge Management oriented to towards external knowledge sources. The ability to assimilate external knowledge depends on the knowledge processing systems which consists of a reward system and a organizational structure. Thus to achieve an effective integration of external knowledge and advanced system of knowledge processing in the company is recommended (Canter & Joel, 2011).

To understand the resulting creation of new knowledge and to identify the subsequent pattern of innovative behaviour requires accounting for knowledge flows taking place in and between firms or other innovative actors. The functioning of innovation networks and their constituiting flows of knowledge rest on the network actor's willingness and ability to exchange knowledge.

The relations span for a certain company may be obtained by mapping the different channels of knowledge flow between actors via buyer-customer relations, via formal cooperation agreements (especially on R&D) and via informal exchange of experience or latest news among managers, researchers and employees via open innovation. This wide web of interaction sketch a network where every actor can be characterized by his position in it.

Individual level in Open Innovation

Chatenier et al. (2010) indicates that it is widely acknowledged that individuals play a crucial role in collaborative knowledge creation process, however the literature tends not to explore the human side of open innovation teams.

Open innovation teams are formed in which professionals from different organizations create new knowledge collaboratively. The diversity of organizational backgrounds is a source of creativity and is considered a critical success factor for innovation projects. However, this factor can be a source of social and communicative dilemmas as well, which may result in conflicts and projects failures.

In this section we examine the competencies individuals need at the operational level for working in open innovation teams and to cope with the challenge they face. Challenge mentioned in the literature are e.g. the difficulty of balancing individual and alliance interests,

lack of trust, the problem of free rider, the difficulty of absorbing and communicating knowledge between partner organizations, and the absence of traditional hierarchichal lines.

Important success factors as governing the project by formal rules and contracts could avoid the problem of free riding and enhance the degree of trust between team members. However, most studies undervalue and underinvestigate the human side of innovation. Therefore, to identify the individual competencies necessary to deal with task and challenge in open innovation is a goal in this section.

Research have found the concept of individual competence attractive for describing essential human knowledge, attitudes, and skills at work and they can be developed, learned and described at different levels and are supposed to have a strong relationship with organizational effectiveness.

Competencies for open innovation professionals are defined by the behavioural characteristics underlying the activities or tasks and challenges described above. In order to identify these competencies (see Table 1), Chautenier et al. (2010) reviewed studies on learning, (inter)-organizational learning, collaboration, (open) innovation, creativity in organizational management, and HRM/D. and Yamazai & Kayes (2004) identified competences related to intercultural competences in order to collaborate in global teams.

The competences that seem most important for open innovation professionals concern brokering solutions and being socially competent and should therefore receive most attention. In any case, the specific set of competencies a person needs may depend on his or her team role.

Companies can use the competence profile for selection and training of their professionals for open innovation teams under the responsibility of HRM/D staff. The profile can also be used as diagnosis and intervention tool for ongoing open innovation team processes.

Conclusion

Each company has a specific set of competencies that allows it to compete in different and unique ways. The way innovation networks work and their constituting flows of knowledge rest on the network's actors' willingness and ability to exchange knowledge. The key to improved work flows in open innovation lies in networks and the ability for people to communicate with each other, not only the ability of computers to provide the right information to people. It is important to learn to manage the informal knowledge pipeline network. Companies should manage the strategic level of knowledge flows as well the operational level.

Organizations that excel at open innovation have a deeply shared view about their strengths and vision in order to define their core competences for grasping opportunities. Important competences for open innovation professionals which have been recognized as necessary for them to generate new knowledge are building trust and dealing with low reciprocal commitment in open innovation team but, especially, brokering solutions and being socially competent in intercultural environments. This is the challenge for Freight Pipeline Industry and this the moment for academic research in open innovation arena.

Table 1. Competences for professionals in Open Innovation Teams.

Cluster of competencies	Competencies
Self-management	Commitment
	Govern oneself Has perseverance. Manage tensions created by multiple accountabilities, tasks and roles
Interpersonal management	Build trust: Is honest. Is open and shares information freely Is competent Is benevolent Is reliable
	Have a social astuteness. Is sensitive to the roles and responsibilities of all partners, aware of their collaborative motivations and expresses understanding and empathy. Knows how to play the political game
	Have inter-personal influences: Use influencing skills Is assertive
	Be a social person: Develops, maintains, uses effective networks. Develops a team spirit.
Project Management	Be inventive: Seek novelties, experiments. Manages ambiguous situations, takes risk, is result oriented, pragmatic. Sees chances, has intuition for innovation, creates a vision. Is proactive. Comes up with ideas him/herself and takes initiatives.
	Control and coordinate
	Cope with chaos and un-certainties
Content Management (Knowledge Management and collaboration)	Externalize information and knowledge Recognizes open and supportive communication methods.
	Interpret. Is curious and listens actively Possess basic knowledge and perceptions of various technical/professional areas and languages
	Negotiate Treats differences as important opportunities. Recognizes types and sources of conflicts, encourages desirable conflict
	Combine Brokers solutions or outcomes
Intercultural competences	Interpersonal relationships in global environment. Valuing people of different culture. Building
	Coping with ambiguity. Listening and observing
	Analytic: Translating complex information
	Action: Taking action and initiative. Managing others
	Adaptative: Adaptability and flexibility Managing stress

Source: Partially based on Chatenier et al. (2010) and Yamazaky & Kayes, (2004)

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